Parental Influence on Children's Oral Health

Introduction

Tooth decay (dental caries) is the most prevalent disease worldwide and the most common pediatric disease in the United States. From 1999 to 2004 the prevalence of untreated tooth decay was 24.5% for children aged 6-11 years and 19.6% for adolescents aged 12-19 years in the United States. Dental caries is still a major oral health problem in most industrialized countries, affecting 60-90% of school children and the vast majority of adults.

Parental attitudes towards the importance of oral hygiene plays a major role in the preservation of children's teeth. Family creates an environment necessary for a healthy lifestyle, increases self-confidence, and helps with habit formation. Parental skills and attitudes towards oral hygiene may have an impact on the formation of their children's oral hygiene habits and the prevalence of oral diseases. Dental caries in young children has a complex multifactorial etiology that has been associated with improper feeding practice and low socioeconomic status.

It has been reported that oral health promotion, which includes the use of fluoride, is effective in reducing caries, and that chair side oral health prevention has been shown to be effective in promoting oral health. It can be concluded that one or two applications per year of 5% NaF varnish can be used as an effective caries preventive measure for high-caries-risk children.
Tooth Decay

Dental caries is a transmissible bacterial infection that is preventable and in some cases even reversible. Dental caries also is the most common dental disease affecting both children and adults in the United States and Canada, and it remains a significant worldwide disease. It occurs in children five times as frequently as asthma and seven times more common than hay fever. Fundamentally, caries is biofilm-induced acid demineralization of enamel or dentin, mediated by saliva. Dental decay is a worldwide issue affecting people of all ages. In California, caries prevalence is particularly high in some low income racial/ethnic populations. The prevalence was 14% among all preschool children, but higher in children from low income families, with 44% among Asians and 39% among latinos. Despite a decrease in caries prevalence and a decrease in untreated tooth decay among 6-19 years age group in the United States, a 15.2% increase in dental disease was noted among the nation's youngest children aged 2-5 years old. Clinical examination results showed a prevalence of dental caries

in the permanent dentition of Peruvian children age 7-9 to be 78.5%. A 2007 study in Brazilian preschoolers showed high levels of caries in primary teeth. A low prevalence of dental caries (6.4%) was recorded at the initial examination, but caries increased threefold (20%) with new disease being observed during the study period. For 5 year-olds, the prevalence of primary teeth dental caries was 45.8%, while for 12 year-olds the prevalence of dental caries in the permanent dentition was 53.6%. Approximately 2.5 million children aged 2-5 years in the United States have untreated tooth decay. Quality of life indicators associated with dental caries include pain, discomfort, self-assessment of poor or very poor oral health, dislike of appearance of teeth, avoidance of laughing or smiling, or being unable to chew. It can also lead to difficulties eating and sleeping, the need for invasive restorative treatment, emergency department visits and inpatient hospitalization, poor quality of life, systemic health problems, and in rare cases, death.

Parent/Caregiver Education Level and Socioeconomic Status

Dental caries is a greater problem for those young children who live in poverty, those from specific ethnic minorities, and those with chronic health problems. Low socioeconomic status, one of the strongest determinants of caries in children, is associated with food insecurity, defined as inadequate access to food resulting in food shortages, disrupted eating patterns, and hunger. Children living in households with low and very low food security have a greater prevalence of untreated caries than children from fully food-secure households. Children of color are more likely to experience tooth decay and to have their cavities untreated. The parent/caregiver, usually the mother, has a critical role in the adoption of protective healthcare behaviors.
and parental feeding practices strongly influence children's eating behaviors.\textsuperscript{12} A low socioeconomic status compromises the ability of individuals to care for their health, leading to reduced resistance to oral and other diseases.\textsuperscript{4} Children of low income families suffer twice as many instances of dental caries as their more affluent peers and their disease is more likely to be untreated.\textsuperscript{7}

An important role in the preservation of healthy children's teeth parental skills and attitudes toward oral hygiene may have an impact on the formation of their children's oral hygiene habits and the prevalence of oral diseases.\textsuperscript{3} Studies have reported that parental education and family income have a direct impact on children's oral health.\textsuperscript{3} Young children are very susceptible to oral diseases, which can be prevented if their caregivers were sufficiently informed about their causes and treatments and were motivated to engage in appropriate oral health promotion.\textsuperscript{14} Children whose parents or caregivers have less than a high school education or whose parents or caregivers are Hispanic, American Indians, or Alaska natives appear to be at markedly increased risk for developing caries.\textsuperscript{7} Displayed below is statistical information on the positive and negative effects of the parents/caregivers education level.

<table>
<thead>
<tr>
<th>Variable</th>
<th>Parental education</th>
<th>P</th>
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<tbody>
<tr>
<td></td>
<td>High educational level</td>
<td>Low educational level</td>
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<tr>
<td>Frequency of tooth brushing</td>
<td></td>
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</tr>
<tr>
<td>Twice a day</td>
<td>375 (48.5)*</td>
<td>201 (42.4)*</td>
</tr>
<tr>
<td>Once a day</td>
<td>350 (45.5)</td>
<td>218 (45.8)</td>
</tr>
<tr>
<td>Several times a week</td>
<td>48 (6.2)**</td>
<td>56 (11.8)**</td>
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<tr>
<td>Preventive measures</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Applied</td>
<td>224 (33.6)</td>
<td>104 (25.7)</td>
</tr>
<tr>
<td>Nonapplied</td>
<td>453 (67.4)</td>
<td>300 (74.3)</td>
</tr>
</tbody>
</table>

Values are number (percentage).

Found from Saldunaite K, et al. The role of parental education and socioeconomic status in dental caries prevention among Lithuanian children.\textsuperscript{3}
Food insecurity, in turn, is associated with oral health-related behaviors, including increased fermentable carbohydrate intake which is a risk factor for dental caries.¹ Food-insecure households may live in neighborhoods where purchasing options are limited to convenience stores, corner markets, and fast food restaurants. These places limit purchasing options to processed foods, snacks, and sugar sweetened beverages and can deprive children of fresh vegetables and fruits, complex carbohydrates, non-processed proteins, and dairy products.¹ Sugar-sweetened beverages, such as soda and sports drinks, are commonly consumed in many countries, and consumption patterns have demonstrated an increase over time. Children aged 2-10 years with a predominately high soft drink diet were found to be 1.8 times more likely to experience dental caries in the primary dentition than children with a predominately high water consumption pattern.¹³ The highest prevalence of early child caries (ECC) in children three and under is due to uncorrected nursing habits such as bottle feeding and the use of a sweetened pacifier at night.⁴ Baby bottle use should not extend beyond 1 year of age and prolonged breast feeding should be avoided. Saliva production decreased markedly during sleep, so any food or drink in a baby's mouth during sleeping periods will stay for many hours and promotes the caries process. The bacteria associated with the formation of dental caries metabolize dietary fermentable carbohydrates (sugars and cooked starch) and produce acids that cause a substantial change in the plaque biofilm pH.⁶ At rest the pH of plaque biofilm is typically neutral. When fermentable carbohydrates are ingested the plaque biofilm pH drops rapidly to create an acidic environment, which in turn causes a breakdown of the structure of the tooth.⁶ Over time repeated acid exposures leads to caries formation.
Preventative Factors for Tooth Decay

Prevention, intervention, and reversal of dental caries can be enhanced by either reducing the pathological factors or enhancing the protective factors. The use of products containing fluoride, daily brushing and flossing, as well as proper dietary choices are all preventative factors against formation of tooth decay.

Fluoride supplements in the form of drops, lozenges, or tablets can provide systemic and topical fluoride to children residing in non-fluoridated water communities. Fluoride in the saliva from topical applications potentiates remineralization and the new fluorapatite-rich veneer of enamel is less soluble than the original hydroxyapatite tooth mineral. Application of the fluoride varnish should occur prior to the development of ECC and therefore should be started in infancy. Children who receive four or more fluoride varnish treatments, over a course of 2 years, have a 35% reduction in caries formation than children who receive no treatment.

Oral biofilm plaque control is the daily removal of as much bacterial burden from the teeth, tongue, and adjacent oral tissues as possible to prevent or control oral diseases. Mechanical removal of oral biofilm through toothbrushing and flossing is the most widely accepted means of plaque control. Plaque biofilm is a negative contributor to the formation of dental caries; therefore, it needs to be removed on a daily basis to prevent caries formation. Multiple different toothbrushing techniques have been developed to aid in proper plaque removal. The two that are most beneficial to children up to the age of 19 are the Fones and Bass techniques. The Fones technique has the toothbrush filaments activated in a circular motion. The Bass technique has the filaments directed apically at a 45-degree angle to the long axis of the tooth. Gentle
force is applied to insert bristles into sulcus; and gentle but firm vibratory strokes without removing filament ends from sulcus are used to remove plaque biofilm. A study conducted on 6-8 year old children from Gulbarga, showed a decrease in plaque scores when using the Fones and Modified Bass toothbrushing techniques. At the beginning of the study, a detailed questionnaire was used to collect information regarding personal details in oral hygiene practices including the brushing technique. Baseline data was collected by drying and isolating the teeth with cotton rolls and disclosing solution. The children were randomly divided into three groups and each group was taught one of the three toothbrushing techniques, horizontal scrub, Fones, and Modified Bass. All of the children were re-examined and reviewed after 24 hours and plaque index was re-assessed to obtain the follow-up data. See graphs below for study results.


**Toothbrush bristles cannot reach interproximally; therefore, it is critical to accompany daily brushing with flossing.** The most effective method of flossing is the C-shape flossing technique. Studies show that flossing reduces plaque biofilm, bleeding, and gingivitis. It is commonly accepted that flossing reduces the incidence of interproximal caries. Proper flossing technique is not easy to master, and detailed
instructions need to be given and demonstrated. In order for brushing and flossing to be optimally effective it needs to be performed twice daily for two minutes.

Dental caries is a transmissible bacterial infection that is preventable and in some cases even reversible. Dental caries also is the most common dental disease affecting both children and adults in the United States and Canada, and it remains a significant worldwide disease that affects people of all ages, ethnicities, and socioeconomic statuses. As our research shows, proper toothbrushing and flossing, and regular fluoride applications can help reduce the rate of dental caries. It is equally as important to incorporate proper oral health education for both the parents and caregivers. Based on the information that we have collected, partnered with the help of Global Brigades, we hope to reduce the rate of dental caries by 10% in Honduran children ages 0-19 years old by educating parents/caregivers about proper oral hygiene practices and nutrition as well as applying fluoride varnish annually.

**Program Proposal**

**Description of the program:**
Dental health program directed towards parents and caregivers of orally compromised children and adolescents. Our goal is to educate on the benefits of regular fluoride applications, proper nutrition, water fluoridation, and demonstrate correct toothbrushing and flossing techniques to reduce and prevent tooth decay. We will be conducting an assessment survey to determine the oral health knowledge of Honduran parents and caregivers of orally compromised children and adolescents.

**Target group description:**
The program will focus on educating Honduran parents/caregivers of a low socioeconomic status who have children or adolescents under the age of 19. The
program will education parents/caregivers with varying education levels ranging from basic elementary skills to college.

**Potential community partners:**
Global Brigades, Henry Schein, Crest, Colgate, Johnson and Johnson, local dental offices.

**Goals**
1) Reduce dental decay in Honduran children and adolescents
2) Educate parents/caregivers about the importance of preventing tooth decay

**Objectives**
1) Dental caries will decrease in Honduran children by 10% with brushing/flossing two times daily for one year using a soft bristled toothbrush and floss when measured using dft/DMFT.
2) 100% of Honduran children will receive fluoride varnish one time per year.
3) Honduran parents/caregivers will be able to describe caries prevention by answering 90% of the questions on the post-test correctly.
4) Parents/caregivers can describe proper toothbrushing and flossing techniques by answering 90% of the questions on the post-test correctly.

**Lesson plan and activities**

**Type of program:** Educational intervention – provide dental education and oral hygiene demonstration to parents/caregivers of Honduran children (ages 0-19) about the importance of daily oral hygiene, benefits of fluoride, and nutrition.

**Program activities:** The anticipated effects will be to improve daily oral hygiene and decrease caries formation in Honduran children. The activities of our program will be to contact Global Brigades to provide a village in need and a date and time to conduct a survey. Upon analysis of the initial survey data, oral hygiene education and demonstration will be developed and implemented on another date to be determined.

**Lesson Activities:**
• Pre Survey
• Slide Presentation: What are Cavities? A presentation explaining how cavities are formed, the risk factors involved, and how to prevent cavity formation using tooth brushing, floss, nutrition, and fluoride. Handout of key points will be given to each parent/caregiver.
• Brushing/Flossing Demonstration: Demonstrate Fones and Bass tooth brushing techniques using typodonts and tooth brush and c-shape flossing technique. Have parents/caregiver demonstrate techniques on typodonts as well as their children.
• Review all information covered and give a post survey to evaluate if learning objectives were achieved. A tooth brush, floss, and fluoride toothpaste will be provided for each child in the parent/caregiver’s home.

Sequence of Events:
• Contact Global Brigades
• Coordinate appropriate dates for travel to Honduras
• Gather supplies (tooth brushes, floss, toothpaste, varnish, typodonts)
• Analyze pre survey results and develop lesson plan
• Make slideshow presentation and handouts
• Give presentation
• Evaluate post survey

Budget
Estimated cost of program: $20,000
• Copying costs for surveys and handouts
• Tooth brushes, floss, fluoride, toothpaste, typodonts
• Pencils
• Travel expenses -$1,600 per person, based on 10 people going

Method of Program Evaluation:
Type of program evaluation: Pre-and-post survey
Survey includes overall education level, knowledge of oral hygiene habits for themselves and their children, and nutrition. Data will be analyzed following pre survey and post survey to determine efficiency of program.
Please answer the following questions to the best of your ability.

Survey
1) What is YOUR highest level of education?
   a) No formal education
   b) Elementary school
   c) Middle school
   d) High school
   e) College

2) How many children do you have? ________
   Gender? M or F
   Age? __________

3) How often does your child/children see a dentist?
   a) My child has never seen the dentist
   b) One time per year
   c) Two times per year
   d) Other ______________

4) How often does your child/children brush their teeth?
   a) Once per day
   b) Twice per day
   c) Three times per day
   d) Never
   e) Unknown

5) How long does your child/children brush their teeth for?
   a) 30 seconds
   b) 1 minute
   c) 2 minutes
   d) More than 2 minutes

6) Do you help your child/children brush their teeth? Y or N

7) How often does your child/children floss their teeth?
   a) Once per day
   b) Every other day
   c) Never
   d) I don’t have access to floss
   e) I don’t know

8) Fluoride: (circle all that apply)
   a) Helps prevent cavities
   b) Strengthens teeth
   c) Is a harmful chemical
   d) Causes cavities
   e) Is an ingredient in toothpaste

9) Do you know how cavities are formed? Y or N
10) Which of the following liquids is most harmful for your teeth?
   a) Milk
   b) Water
   c) Soda
   d) Juice
11) Teeth are pulled because of _______________.
   a) Injury
   b) Cavity
   c) Pain
   d) I don’t know
12) How long do you brush your teeth for?
   e) 30 seconds
   f) 1 minute
   g) 2 minutes
   h) More than 2 minutes
13) How often do you see a dentist?
   e) I have never seen a dentist
   f) One time per year
   g) Two times per year
   h) Other _______________
14) How often do you floss your teeth?
   f) Once per day
   g) Every other day
   h) Never
   i) I don’t have access to floss
   j) I don’t know

References


